158 of the body 142. So configured, the body 142 is connected to the abutment connector 146 by pressing the coronal end portion or surface 158 of the body 142 into opening 160. While the illustrated and preferred embodiments show that the press-fit connection may be provided in addition to other connecting structures between body 142 and connector 146, such as by retaining screw, threaded shank, reinforcing members (described below), fusion welding or adhesives, it should be understood that the press-fit connection may be the sole connection between the abutment connector 146 and the porous body 142.

In another aspect of this embodiment, body 142 is provided with a varying cross-sectional dimension so that a tapered outer surface 162 extends inwardly as it extends distally. The tapered surface 162 limits interference with the roots of adjacent teeth, and helps to redirect and dissipate compressive forces, generated from mastication, into transverse or lateral directions relative to a longitudinal axis of the implant. The tapered surface 162 also assists in aligning the implant with a bore on the jaw bone as it is being inserted into and through the bore.

Referring now to FIGS. 11A, 11B, 12A, and 12B, there are illustrated a pair of eighth alternate embodiments of an implant. The two alternative embodiments are identical in all respects except for element 188 of FIGS. 11B and 12B, as will be explained herein. Implant 170 has embedded reinforcing 171 to strengthen a substantially porous body 172. These reinforcements may be placed at the locations of greatest stress to provide the maximum amount of strengthening to the implant. These locations may be near the center of or may be near the outer diameter of the implant. The body 172 has a material as described above for the body 81 of implant 80. Implant 170 also has an abutment connector 174 disposed on a coronal end 176 of the body 172. The abutment connector 174 is not particularly limited to a specific abutment-connecting configuration. For implant 170, reinforcement 171 includes a plurality of reinforcing members 178, 180, 182 and 184 generally aligned with, and preferably offset radially from, central longitudinal axis C of the body 142'. In one form, the reinforcing members 178, 180, 182, 184 are elongated bars and may be made of the same or similar material to that of the abutment connector 174 and core 22 (FIG. 1) mentioned above, which includes titanium. The members 178, 180, 182, 184 are uniformly spaced about the axis C and generally extend in a coronal-apical or superior-inferior direction. With this structure, the reinforcing members 178, 180, 182, and 184 dissipate compressive forces impacting on the implant from mastication. In the current embodiment, the reinforcing members 178, 180, 182, and 184 extend from the abutment connector 174 in order to provide further anchoring the abutment connector 174 to the porous body 172. In this case, the members 178, 180, 182 and 184 may be integrally formed with, welded or otherwise connected to the abutment connector. This results in the direct transmission of impact forces from the abutment connector 174 to the reinforcing members 178, 180, 182, and 184, which further aids in dissipating the forces.

The abutment connector 174 also may be provided with a depending flange 186 (as shown in FIG. 11B) similar to flange 156, and the connector 174 may be appropriately sized, in order to provide a press-fit connection between the connector 174 and porous body 172, as described for implant 140.

As another alternative configuration, in addition to the reinforcing 171, the abutment connector 174 may be a portion of a central core 188 (as shown in FIGS. 11B and 12B) that is provided to increase the strength of the implant 170. As shown in FIG. 11B, the core 188 extends downwardly from the abutment connector 174 and into a region near the apical end of the body 172. The reinforcing members 178, 180, 182, and 184 are generally aligned with, and spaced radially inward from, the core 188 and angled inward toward the core 188 proceeding from the coronal end toward the apical end.

Referring now to FIG. 13, there is illustrated another dental implant 200 with both a core and additional reinforcing. The implant 200 has an abutment connector 202 shown with an integral abutment 210 as one example abutment-connecting configuration. The abutment connector 202 has an enlarged central core 204 that extends into a porous body 206. The body 206 also has reinforcing members 208. The combination of reinforcing members 208 and core 204 provide substantial strength to compensate for significant bone loss in the jaw as occurs with geriatric patients. A heavily reinforced, short and wide implant 200 as measured on the outer surface of the porous body 206, is particularly suited for replacement of molars. Thus, in one example embodiment, the porous body 206 may provide outer dimensions of a width w of approximately 6 mm and a height h of approximately 6 mm. The reinforcing members 208 are disposed and oriented similarly to that of reinforcing members 178, 180, 182, and 184 in implant 170 mentioned above. In this embodiment, however, the reinforcing members 208 are not connected to the abutment connector 202 and do not angle inward.

It will be appreciated that other configurations for the reinforcing in FIGS. 11-13 may be provided than that shown including more or less reinforcing members. The reinforcing members may be provided in addition to a central core of a different material than the porous body or may be provided instead of such a central core. The reinforcing members may also generally extend in directions other than, or in addition to, a coronal-apical (or superior-inferior) direction.

From the foregoing, it will be understood that the reinforcing for the porous material may include a core, whether a central core, off-center, solid, or entirely or partially hollow. The reinforcing may additionally or alternatively include off-center reinforcement members, whether or not a central core is present, and the reinforcing may protrude through the porous material, whether or not the core also protrudes through the porous material.

The porous body 206, as well as any of the porous bodies and porous sleeves described herein, may have a tapered outer surface 212 similar to tapered surface 162.

While this invention has been described as having a preferred design, the present invention can be further modified within the spirit and scope of this disclosure. This application is therefore intended to cover any variations, uses, or adaptations of the invention using its general principles. Further, this application is intended to cover such departures from the present disclosure as come within known or customary practice in the art to which this invention pertains and which fall within the limits of the appended claims.

What is claimed is:

1. A dental implant, comprising:

an elongated implant body having opposed coronal and apical ends;

an abutment connector having correspondingly opposed coronal and apical ends, the abutment connector including a recess for receiving the coronal end of the body at the apical end of the abutment connector, the apical end of the abutment connector defining a non-threaded press-fit connection between the abutment connector and the coronal end of the body, the abutment connector being adapted for connection to an abutment at its coronal end, the abutment connector further defining a core extending from its coronal end to its apical end;

both the implant body and abutment connector having correspondingly aligned bores configured for receiving a retaining screw;

wherein the implant body further comprises a plurality of reinforcing members embedded within the body.